

## Chapter 2.5 PUBLIC HEALTH/AQUATIC LIFE CONCERNS

Increasingly, the DEQ is addressing the role toxicants play in reducing water quality in state waters and supports programs to monitor, evaluate, and reduce toxicity to aquatic life and human health. Many of the programs in place at DEQ that address toxicity in state waters are described and discussed throughout this report.

The toxic pollutants that were monitored during the reporting period include toxic organics, metals and pesticides. Information on the state's monitoring programs and the results of this monitoring for toxics in water column, fish tissue, and sediment is provided in Chapters 3.1 and 3.3 of this report. A discussion of the methodology used to determine elevated levels of toxicants is provided in Chapter 3.2.

In January 1992, the SWCB adopted mandatory surface water quality standards for the protection of aquatic life for 41 substances, and human health standards for 66 substances. These standards enhance the Department's ability to reduce toxicity in state waters through permitting and enforcement activities. Additionally, there are surface water quality standards for mercury in fresh water, chlorine, and tributyltin. Virginia differentiates between standards and criteria. Standards are always mandatory, while criteria may be modified on a case-by-case basis.

Numeric surface water quality criteria for the protection of aquatic life have been adopted, as of the end of the current reporting period, for the following 36 toxic substances:

Aldrin	Demeton	Methoxychlor
Ammonia	Dieldrin	Mirex
Arsenic	Endosulfan	Nickel
Cadmium	Endrin	Parathion
Chlordane	Guthion	PCB's
Chloride	Heptachlor	Pentachlorophenol
Chlorine	Hydrogen Sulfide	Selenium
Chlorpyrifos	Kepone	Silver
Chromium	Lead	TBT
Copper	Lindane	Toxaphene
Cyanide	Malathion	Tributyltin
DDT	Mercury	Zinc

### Fishing Advisories and Restrictions

The VDH Division of Health Hazard Controls has six health advisories, limiting fish consumption, and one restriction, prohibiting consumption, currently in effect. A fishing restriction allows sport fishing within the affected area, but the taking of fish for human consumption is prohibited. A health advisory warns of potentially dangerous levels of contamination found in fish tissues in an affected area and in most cases, limits consumption but does not prohibit it. Under health advisories, the population at risk and a safe maximum consumption rate may be specified. These areas are described below.

### Kepone in the Lower James River

From 1966 through 1975 Allied Chemical Company and its subsidiary Life Science Products, Inc. produced a persistent chlorinated hydrocarbon insecticide called Kepone. During production, an estimated 90,720 kg of Kepone was released to the environment through atmospheric emissions, wastewater discharges, and bulk-disposal of off-specification batches. The James River and its tributaries from Richmond to Newport News were contaminated with Kepone. In 1975, the entire James River from the fall line at Richmond to the Hampton Roads/Norfolk Bridge Tunnel, including all tributaries, was closed to the taking of any shellfish and/or finfish because of Kepone. From 1975 through 1988 various Kepone bans were in place. In 1988, all James River fishing restrictions due to Kepone were allowed to expire as Kepone levels in fish remained below the U.S. Food and Drug Administration (FDA) action level of 0.30 ppm. This

area is currently under a contaminant advisory, covering the mainstem James River and all tributaries from the fall line at Richmond to the Hampton Roads-Norfolk Bridge Tunnel. This advisory does not limit or restrict the consumption of fish from this part of the river.

DEQ has continually monitored Kepone levels in the James River since its identification in 1975. The major areas of concern were Kepone levels in the water column, finfish, and sediment of the James River and its tributaries, and in the ground water in Hopewell. After continuous non-detectable results, water column monitoring was discontinued in 1981. Kepone levels in finfish, ground water, and sediment have decreased since the onset of the problem. Continued sediment sampling will provide the state with an up-to-date portrayal of Kepone levels throughout the contaminated reach of the river. The waterbodies affected by this health advisory are: VAT-G11, VAT-G10, VAP-G08, VAP-G07, VAP-G04, VAP-G03, VAP-G02, VAP-G01, and VAP-J15.

#### Mercury in the North Fork Holston River

Eighty miles of the North Fork Holston River in southwestern Virginia were contaminated with mercury by releases from the Olin manufacturing operation in Saltville. Although the chemical plant closed in 1972, mercury levels in fish remain above FDA action levels, and the consumption of fish from this area is prohibited. Catch-and-release fishing is allowed. This health restriction includes waterbodies VAS-013, VAS-012, VAS-011, and VAS-010.

#### Mercury in the South River and the South Fork Shenandoah River

Mercury was released by E. I. DuPont de Nemours and Company, a synthetic fibers plant in Waynesboro, into the South River and South Fork Shenandoah River from 1929 to 1950. The contamination was discovered in 1977 and was found to have contaminated 103 river miles, from the plant to the Page/Warren county line. These areas remain under a health advisory for fish consumption due to mercury contamination. The VDH recommends that no more than one meal (2 pound) per week of fish from these waters be consumed. Small children and pregnant women are advised not to consume any fish containing mercury. This health advisory is located in all or a portion of waterbodies, VAV-B40, VAV-B38, VAV-B37, VAV-B35, VAV-B33, and VAV-B32.

#### PCBs in the South Fork Shenandoah River, North Fork Shenandoah River and Shenandoah River

The VDH has issued a public health advisory warning against the consumption of fish taken from the South Fork Shenandoah River from the State Route 619 bridge downstream to the Shenandoah River headwaters; from the North Fork Shenandoah River at its confluence with Passage Creek downstream to the Shenandoah River; and from the Shenandoah River from the confluence of the North and South Fork Shenandoah Rivers to the Virginia/West Virginia state border. This covers approximately 45 stream miles. This advisory was issued after DEQ monitoring revealed PCB levels in fish tissue samples above the 2.0 ppm FDA action level. The advisory states that fish caught in these waters should not be consumed. The source of this contamination has been identified as Avtex Fibers Front Royal Inc. This plant closed in 1989 following revocation of their VPDES permit. This health advisory is located in waterbodies VAV-B58, VAV-B57, VAV-B55, VAV-B51, VAV-B41.

#### PCB in the Roanoke River

In July 1998 a health advisory for fish consumption has been issued for a 50 mile stretch of the Roanoke River running through Campbell, Charlotte, Halifax and Pittsylvania counties. Polychlorinated biphenyls, commonly known as PCBs, have been detected in fish tissues of striped bass, white bass and carp. The advisory area begins at Seneca Creek at Route 704 near Long Island and continues downstream to the point where a pipeline intersects Route 803 and where Route 633 in Charlotte county crosses the Roanoke River (approximately 5.4 river miles below the route 360 bridge). People should eat no more than

two eight-ounce meals a month of these fish species. These meal estimates are based on the possibility that eating PCB-contaminated fish may increase the risk of cancer in humans. A source of the contamination has been identified but other sources are suspected. In December 1999, the VDH expanded this fish advisory to include 29 additional miles upstream including Altavista to the Leesville Dam. Affected waterbodies are VAW L-19, VAW-L30, VAW-L31, VAP-L36, VAP-L38, VAP-L40, VAP-L75 and VAP-L80

#### PCB in the Dan River

A health advisory for fish consumption has recently been issued for a 42 mile stretch of the Dan River from Kerr Reservoir at Staunton River State Park to southwestern Halifax County where the river crosses into North Carolina, north of Virginia Route 62. Polychlorinated biphenyls (PCBs) have been detected in seven fish species collected in the South Boston, Va area. Flathead and channel catfish were the only species determined to have levels of PCBs in the tissue above 600 ppm, the VDH level of concern. The advisory cautions people to eat no more than two eight-ounce meals a month of flathead and channel catfish taken from the advisory area. Pregnant women and children are advised not to eat any of these fish. Affected waterbodies are VAW-L60,VAP-L62,VAP-L64 and VAP-L73.

#### PCB in the Potomac River

A health advisory for fish consumption has been issued for a 33 mile stretch of the Potomac River from the Woodrow Wilson Bridge to Bent Point at the mouth of Aquia Creek. The advisory states Achannel catfish larger than 18 inches caught in the tidal areas in several tributaries flowing into the Potomac river near Quantico, Va may pose a potential public health risk@. Since most of this area is in Maryland, the VDH has not posted any warning signs.

#### PCB in the Levisa River

A health advisory for fish consumption has been issued for a 12 mile section of the Levisa River from Grundy, VA to the Kentucky state line. The advisory states Auntil the extent of the potential PCB contamination is determined, the VDH is recommending that people eat no more than one eight-ounce meal per month of any fish taken from that section of the Levisa River.@ The waterbody affected is VAS-Q08.

#### Tributyltin

Surface water samples were collected and analyzed by the Applied Marine Research Laboratory at Old Dominion University for the determination of the concentration of tributyltin (TBT) at one station in the Hampton Roads Harbor area and eleven stations in the Elizabeth River area of the lower James River. The samples were collected during six monitoring events over the period of June 1993 to March 1995. In-stream concentrations were compared to the Virginia Water Quality Standard for TBT in saltwater surface waters (VR680-21-01.13) which are not at any time to exceed 0.001 parts per billion (ug/l) TBT. The station in the Hampton Roads Harbor area did not exceed the standard. Six of the eleven stations in the Elizabeth River area exceeded the standard for TBT. The distribution of stations exceeding the TBT standard are as follows: three stations in the Elizabeth River main stem, one station in the Eastern Branch Elizabeth River, and two stations in the Southern Branch Elizabeth River. The exceedances occurred in segments which support considerable commercial vessel traffic with TBT hull coatings.

#### Shellfish Condemnations

The Virginia Department of Health has prohibited and/or condemned harvest of approximately 148 square miles of productive shellfish areas in the waters of Virginia. Another 3 square miles square miles have been seasonally condemned, which restricts direct harvesting from 1 April to 31 October of each year. These areas are all located in the Chesapeake Bay and Tidewater areas of the state, and include waters surrounding certain point source discharges, as well as areas with elevated fecal coliform bacteria concentrations or other problems. Shellfish may be harvested from most restricted areas; however, they

must first be relayed to approved waters for depuration for 15 days before marketing. Relaying is only allowed when the water temperature is above 50°F. The taking of shellfish is prohibited in three bodies of water: the Elizabeth and Lafayette Rivers, both within the lower James River subbasins; and Little Creek in the Small Coastal and Chesapeake Bay Basin.

## PART II

## STATE BACKGROUND INFORMATION

### Chapter 2.5 Public Health/Aquatic Life Concerns

#### Fish Tissue Contamination

##### Overview

**Routine and Special Study Fish Tissue Data.** This section summarizes the fish tissue contaminant data collected, analyzed and/or evaluated during the five-year period covered in this report. The data were collected via DEQ's routine five-year rotational monitoring of fish and sediment samples for contaminant analysis in the state river basins (see Section 3.1-3 for details about this program), as well as from follow-up and special monitoring studies conducted once the routine program identified potential problem areas.

**Screening Value Exceedences.** Appendix B includes the approximately 130 stations that DEQ sampled in its routine rotational river basin monitoring program during this five-year monitoring period (1994-1998) and tabulates the number of exceedences of human health screening values for those routine monitoring stations where there were exceedences for one or more contaminants in edible fish fillets or shellfish. (Contaminant screening values are computed using EPA risk assessment techniques for non-carcinogen and carcinogen effects.) These stations were not randomly selected. Instead, many of the stations were targeted for sampling because of potential or known water pollution problems identified via a search of historical data and reports.

**Selection Basis for Stations Discussed.** This report summary highlights those stations from Appendix B where current contaminant levels alone - or in combination with other data and studies - were:

1. at a Virginia Department of Health ("VDH") level of concern for human health requiring a fish consumption advisory or advisory extension (see Section 2.5), or
2. at a VDH or DEQ level of concern requiring special follow-up studies (most are listed at <http://www.deq.state.state.va.us/water/reports.html>, or
3. below levels of concern where VDH determined that an existing fish consumption advisory could be lifted due to a decline in levels of contamination.

During this period DEQ and the VDH were also able to complete risk evaluations at several sites reported for ongoing or future evaluation in previous editions of this report. These decisions are included in this report in order to finalize the information on previously reported potential human health concerns. This report does not highlight station exceedences where VDH determined at the time of data review that no further action was needed unless these stations were monitored as a follow-up to a VDH request for additional sampling.

##### *Lead*

**No Current EPA Screening Value.** The specific toxicological information needed to calculate a screening value is not available for lead at this time and EPA does not have a screening value for lead. Therefore, DEQ cannot use a screening value to assess the data for lead found in fish tissue. To address this issue, DEQ reports any concentration of lead detected by our contract analytical lab to the VDH for its review

and recommendations. To address this unusual situation in this report, all instances of lead detected at any concentration in fish tissue are noted in Appendix B and are classified as "fully supporting but threatened."

**1993 - 1994 Lead Data Suspect Due to Lab Problems.** Previous 305(b) reports noted that lead had been detected in at least some of the fish samples at each station sampled in 1994 as well as in 1993, and that follow-up work was planned. Upon further investigation, DEQ identified detection limit problems at the contract laboratory. This made all of the lead concentrations for the 1993 - 1994 fish tissue samples suspect. Therefore, these lead concentrations were not used in the assessment of the 1993-1994 data and are not included in Appendix B of this report as an exceedence. Furthermore, VDH did not consider the concentrations for the suspect lead data to be at levels of concern. In 1995 DEQ switched to another contract lab capable of detecting metals and organics at lower detection limits. Lead was detected in less than 4 percent of fish analyzed between 1995 and 1998. When DEQ resampled one of the 1994 stations with suspect lead levels (Mattaponi River) in 1996, lead was reported below detection limits (<0.1 ppm).

**VDH Requests for Follow-up Sampling.** In subsequent monitoring years (1995 – 1998) covered by this report, lead was detected at 15 river basin stations. Of these 15 stations, VDH asked DEQ to follow-up with additional sampling at two sites sampled in 1998 (Kiptopeke State Park and Bagwell Creek). These two stations were resampled in 2000 but the data were not received from the contract laboratory by the time this report was prepared.

### **Polychlorinated Biphenyls (PCBs)**

**Detection of PCBs in Fish at Sites Already Under an Advisory.** During the systematic river basin rotational sampling of fish, DEQ revisited some stations in rivers where fish consumption advisories were already in place. For example, VDH reviewed the 1996 PCB data from stations on the Shenandoah River and South and North Forks of the Shenandoah River that contained PCBs above the human health screening value. Because these fish were from areas currently subject to a fishing advisory, VDH determined that no further action was needed at that time.

**Roanoke (Staunton) River Fish Consumption Advisory.** Data collected by DEQ in 1993 during a special Roanoke (Staunton) River basin study and results from a subsequent special study in 1998 led VDH to issue a fish consumption advisory in 1998. The area covered by the advisory was expanded in 1999 in response to additional DEQ sampling data indicating levels above the VDH level of concern of 600 parts per billion. (See page 2.5-3 of this report and the DEQ web site for additional information). DEQ is now focusing on identification of potential point sources for the contamination.

**Levisa Fork Fish Consumption Advisory.** In 1997 DEQ included a station on the Levisa Fork at the state line in its routine river basin rotational sampling because PCBs had previously been detected in fish at this location. Three out of four of the fish species samples collected at Levisa Fork in 1997 exceeded the 600 parts per billion level of concern for PCBs established by VDH for issuing fish consumption advisories. The VDH issued a fish-eating advisory for a 12-mile stretch of Levisa Fork in 1999 (See page 2.5-3). In response to a request from VDH, DEQ conducted a special fish and sediment study in Levisa Fork in 2000 in an attempt to bracket the extent of fish contamination; results were not back from the lab at the time this report was prepared.

**Deep Creek Follow-up Sampling.** VDH asked DEQ to resample Deep Creek (Southern Branch of the Elizabeth River) in 2000 because a gizzard shad sample collected at that station in 1998 exceeded the screening value for PCBs. DEQ had also conducted a special study in the Elizabeth River in 1993; these stations are listed in Appendix B. PCB levels in all species collected at the Deep Creek station in 2000 except gizzard shad were below the VDH 600 ppb level of concern. VDH has reviewed the recent monitoring data and determined, since gizzard shad is not the type of fish that people commonly eat, that no further action is warranted at this time. Additional DEQ sampling in the Elizabeth River system is planned for 2001.

**Four Mile Run Special Study.** Samples were collected by DEQ during October 1997 in Four Mile Run in response to concerns about run-off problems from the nearby Potomac Yard in Northern Virginia. The local health department made the request for the special study via the DEQ Northern Regional Office in response to citizen concerns. VDH reviewed the data results and determined that the level of contaminants (PCB, total chlordane and total PAH) posed no significant risks to human health.

**James River 1997 Fish Study of PCB Levels.** The US Fish and Wildlife Service had expressed concern due to the presence of PCBs in fish tissue from the James River (River Miles 76.0 -69.0) and the DEQ's "low" priority designation during its review of DEQ's final 303(d) TMDL (Total Maximum Daily Load) Priority List for 1996. The Service also expressed concern that the area was a roosting habitat for the bald eagle and limited fish tissue data were available for the river segment. In addition, high concentrations of polychlorinated terphenyls (PCTs) in sediment in Bailey Creek were identified by DEQ-Piedmont Regional Office ("PRO") staff. So in 1997, 45 fish tissue samples were collected from seven stations in the James River and its tributaries in the vicinity of Hopewell. The study was a joint effort between DEQ-PRO and Central Office Staff, and involved tissue and sediment collections. These samples were analyzed for PCBs, PCTs, and chlorinated pesticides. Thirty-five of the 45 fish tissue samples had PCB levels in excess of the DEQ screening value; however, only one sample had a PCB concentration above the VDH advisory level. Fish tissue data were transmitted to PRO staff during November 1998. During early December 1998 PRO staff made a data report presentation to other DEQ staff and VDH personnel. An old landfill in Hopewell was identified as the source of PCB and PCT to the James River system. At PRO's request, USEPA Superfund monitoring staff sampled the landfill area and creek running through it in January 1999 and determined that the site contamination was not sufficient to warrant Superfund cleanup. EPA found PCTs upstream of the landfill and suggested that old industrial sources might be contributing to the contamination. At the request of the industry PRO sampled stormwater outfalls at the headwaters of the creek for PCTs and PCBs in May 1999; PRO found PCTs in the 1 to 5 ppm range and PCBs in the 0.2 to 1.6 ppm range in sediments. These results were below the clean-up requirements of EPA Superfund, and the case was considered resolved pending further information. VDH has asked DEQ to resample Bailey Bay in either 2001 or 2002.

**Revisit Potomac River Fish Consumption Advisory Area.** The fish consumption advisory for the Potomac River is described on page 2.5-3. At the request of VDH, DEQ resampled the Potomac River and Virginia tributaries in 2000. Some carp and channel catfish samples from the Potomac embayment stations had PCBs higher than the VDH 600 ppb level of concern for PCBs. However, all these stations are within sections of the river where a fish consumption advisory is already in effect. Therefore, based on the year 2000 monitoring data, the VDH has determined that no further action is warranted at this time.

**Mountain Run and Bull Run.** During this period the DEQ completed follow-up monitoring of fish and sediment from Mountain Run and Bull Run. Latest sampling results in 1999 found PCBs and PAHs in the fish but not at the VDH levels of concern.

#### *Mercury*

**North Fork Holston.** A station on the North Fork of the Holston River exceeded the screening value for mercury in 1997, but this area was already under a long-term fish consumption advisory for mercury contamination from a Superfund site, described on page 2.5-2.

**Shenandoah River Mercury Monitoring.** DEQ's Valley Regional Office has an ongoing monitoring program for mercury in fish tissue, water and sediment in the South River and South Fork Shenandoah River. There have been restrictions or health advisories on consumption of fish from portions of the South and South Fork Shenandoah Rivers since the 1970s (see Section 2.5-2). The current advisory has been in place since the 1980s. The mercury contamination originated from historic practices at the E.I. DuPont Plant in Waynesboro. In a settlement between DuPont and the Commonwealth in the early 1980s, a trust fund was established to support monitoring in the river for a projected 100-year period. Fish were most recently sampled in 1996 and

1999. The results are available on the DEQ web site at <http://www.deq.state.va.us/rivers/mercury.html>. The VDH evaluated the data and determined that the existing fish consumption advisory should remain in effect. DEQ continues to evaluate mercury contamination in this system through regular meetings with stakeholders, review of literature, and communications with other experts in the field. Additional fish tissue monitoring by DEQ is being considered for 2001.

**Dragon Swamp.** Based on mercury levels detected in fish collected during the routine rotational river basin sampling in 1998, VDH requested that DEQ resample the site in 2000. The results were not back from the lab on samples collected in 2000 at the time this report was prepared.

**Tennessee Big Sandy River Basin.** VDH had concerns about mercury concentrations in whole fish from two stations (Cranes Nest River and J. W. Flannigan Reservoir) sampled during the DEQ 1991 coal fields study. However, VDH could not draw any significant conclusions on associated health risks from the whole fish data. DEQ resampled these two stations in 1997 for mercury analysis of edible fillets. VDH has reviewed the data from 1997 and determined that the reported levels were not at a level of concern and that no additional sampling from these sites was necessary.

#### *DDT/DDE*

**Two Lakes At Tidewater Community College.** The DEQ Waste Division requested VDH review of DDT/DDE concentrations in whole fish collected from two Tidewater Community College lakes at a Superfund site. The VDH preferred edible fillets but found that even the concentrations in the whole fish were below levels of concern. At the request of citizens, DEQ collected fish from the two lakes for analysis of edible fish fillets in 2000, but the data results were not back from the lab at the time this report was prepared.

#### *Dioxin*

**Blackwater and Nottoway Rivers.** Due to dioxin contamination by the Union Camp Company in Franklin, Virginia, a fish-eating advisory was issued by the VDH in 1990 for portions of the Blackwater and Nottoway Rivers. Union Camp subsequently changed its process operations. At the request of the VDH, DEQ sampled one station each in the Blackwater and Nottoway Rivers in late 1997 for dioxin levels in fish. The results verified similar findings by Union Camp Company that the dioxin levels in the fish were below the VDH level of concern, and the advisory was lifted by VDH on March 26, 1998.

#### *Kepona*

**James and Chickahominy Rivers.** DEQ, in consultation with the VDH, annually collects fish samples from the James River downstream of Hopewell and the in the vicinity of the mouth of the Chickahominy River for kepona analysis. Nine of the 253 fish samples collected and analyzed in 1994 exceeded the FDA action level of 0.3 ppm. In 1995 one sample out of 260 exceeded the 0.3 ppm action level. Since 1995, none of the edible fillet samples from the annual collections has exceeded the FDA action level.

#### Relationship between *Pfiesteria* and water quality

The 2000 water quality assessment included the sampling and analysis for a microorganism ***Pfiesteria piscicida***. This microorganism has been linked to extensive fish kills in North Carolina estuaries. Leading experts from North Carolina State University and the Florida Department of Environmental Protection as well as other scientists have not identified the toxic microbe in samples from Virginia. However, *Pfiesteria piscicida* was found in several Maryland rivers with fish kills during the summer of 1997. No confirmed cases were found in the waters of Virginia during the 1999 summer season and at this time, DEQ

has reserved judgement on water quality issues associated with *Pfiesteria*.

#### Reporting fish kills or fish with lesions

DEQ has responsibility for investigating fish kills and reports of fish with lesions in Virginia waters. Call 1 (800) 592-54VA to be directed to the appropriate regional office. Once reported, DEQ will collect water samples for oxygen and other chemical parameters along with actual fish samples. Water samples are sent to Old Dominion University (ODU) for analysis and fish samples are sent to Virginia Institute of Marine Science (VIMS). For any health related concerns, call the VDH hotline at 1 (888) 238-6154.